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(57) Abstract

An aqueous liquid cleansing and moisturising composition comprisign a surface active agent, a skin benefit agent having a weight average particle size in the range 50 to 500 microns and a structurant. The composition is substantially free of insoluble fatty acid soap and has a viscosity of at least 5000 Pas at a shear stress of 0.01 Pa at 25 °C.

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DETERGENT COMPOSITION

The present invention relates to detergent compositions suitable for the care and personal washing of the skin. In particular, it relates to compositions which are formulated to give mild cleansing and conditioning of the skin.

Compositions formulated to cleanse the skin are well known. It is also known to formulate products which provide both a cleansing and a moisturising benefit.

For example WO 90/13283 discloses a composition comprising an acyl ester of an isethionic acid salt, a long chain fatty acid, a moisturiser component and, optionally, soap.

One of the problems which may be encountered with such dual purpose compositions is that, whilst cleansing may be effective, there is an insufficient level of moisturising.

We have found a way of formulating such compositions such that they can deliver effective moisturising, conditioning or protection of the skin.

In WO 94/01085 and 94/01084 the advantage of depositing large particles of petrolatum from soap based compositions to moisturise the skin is recognised.

However, according to WO 94/03152, concerned with shower gels comprising a non-soap detergent, silicone oil added to condition the skin and cationic polymers, the maximum average droplet size of the silicone oil that can be used is 2 microns, if product stability is to be maintained.

We have now found that larger particles, by particle is meant a solid particle or liquid droplet, of benefit agents such as

silicone oil can be incorporated into non-soap based compositions and stable compositions formed by the use of structurants.

Thus, according to the invention there is provided an aqueous liquid cleansing and moisturising composition comprising:-

a) a surface active agent selected from anionic, nonionic, zwitterionic, and cationic surface active agents; and mixtures thereof;

b) a benefit agent having a weight average particle size in the range 50 to 500 microns; and

c) at least one structurant;

wherein the composition is substantially free of insoluble fatty acid soap and has a viscosity of at least 5,000 Pas at a shear stress of 0.01 Pa at 25°C.

The viscosity quoted is the minimum viscosity required to suspend benefit agent having a weight average particle size of 50 microns such that the composition has a separation rate at 25°C of less than 1mm per year.

As the weight average particle size of the benefit agent increases much higher viscosities are required to give a composition with the same stability.

The composition is suitable for cleansing and "moisturising", "conditioning" or "protection" of the skin. The benefit agent is included in the composition to moisturise, condition

and/or protect the skin. By "benefit agent" is meant a substance that softens the skin (stratum corneum) and keeps it soft by retarding the decrease of its water content or protects the skin.

Preferred benefit agents include

a) silicone oils, gums and modifications thereof such as linear and cyclic polydimethylsiloxanes; amino, alkyl alkylaryl and aryl silicone oils;

b) fats and oils including natural fats and oils such as jojoba, soyabean, rice bran, avocado, almond, olive, sesame, persic, castor, coconut, mink oils; cacao fat, beef tallow, lard; hardened oils obtained by hydrogenating the aforementioned oils; and synthetic mono, di and triglycerides such as myristic acid glyceride and 2-ethylhexanoic acid glyceride;

c) waxes such as carnauba, spermaceti, beeswax, lanolin and derivatives thereof;

d) hydrophobic plant extracts;

e) hydrocarbons such as liquid paraffins, petrolatum, microcrystalline wax, ceresin, squalene, squalane, and mineral oil;

f) higher fatty acids such as lauric, myristic, palmitic, stearic, behenic, oleic, linoleic linolenic, lanolic, isostearic and poly unsaturated fatty acids (PUFA) acids;

g) higher alcohols such as lauryl, cetyl, steryl, oleyl, behenyl, cholesterol and 2-hexadecanol alcohol;

h) esters such as cetyl octanoate, myristyl lactate, cetyl lactate, isopropyl myristate, myristyl myristate, isopropyl palmitate, isopropyl adipate, butyl stearate, decyl oleate, cholesterol isostearate, glycerol monostearate, glycerol

distearate, glycerol tristearate, alkyl lactate for example lauryl lactate, alkyl citrate and alkyl tartrate;

i) essential oils such as fish oils, mentha, jasmine, camphor, white cedar, bitter orange peel, ryu, turpentine, cinnamon, bergamont, citrus unshiu, calamus, pine, lavender, bay, clove, hiba, eucalyptus, lemon, starflower, thyme, peppermint, rose, sage, menthol, cineole, eugenol, citral, citronelle, borneol, linalool, geraniol, evening primrose, camphor, thymol, spirantol, pinene, limonene and terpenoid oils;

j) lipids such as cholesterol, ceramides, sucrose esters and pseudo-ceramides as described in European Patent Specification No. 556 957;

k) vitamins such as vitamin A and E, and vitamin alkyl esters, including those vitamin C alkyl esters;

l) sunscreens such as octyl methoxyl cinnamate (Parsol MCX) and butyl methoxy benzoylmethane (Parsol 1789);

m) Phospholipids; and

n) mixtures of any of the foregoing components.

The benefit agent may be incorporated in a carrier in the compositions of the invention, particularly if it is likely to suffer detrimental interactions with other components of the composition. Benefit agents for which such detrimental interactions may occur include lipids; alkyl lactates; sunscreens; esters such as isopropyl palmitate and isopropyl myristate; and vitamins. The carrier can, for example, be a silicone or hydrocarbon oil which is not solubilised/ micellised by the surface active phase and in which the benefit agent is relatively soluble.

Particularly preferred benefit agents include silicone oils, gums and modifications thereof; esters such as isopropyl palmitate and myristate and alkyl lactates.

The benefit agent is preferably present in amount of from 0.1 to 15 wt%, most preferably from 0.2 to 10 wt%, more preferably from 0.5 to 7 wt%.

An advantage of the composition according to the invention is that, during use, it deposits benefit agent onto the skin at a level which results in a perceivable benefit. Without being bound by theory, it is believed the benefit agent is dispersed into large pools during dilution of the composition in use and these pools deposit readily onto the skin.

In WO 94/01084 and WO 94/01085 compositions comprising large particles of petrolatum are structured by the presence of at least 5wt% insoluble fatty acid soap. However, it is believed such high levels of solid phase material may adversely affect the amount of benefit agent deposited onto the skin. Thus, in the present invention we require the composition to be substantially free of insoluble fatty acid soap, by which is meant the level of insoluble fatty acid soap is below 1 wt% based on the composition.

Structurants are an essential feature of the present invention. Suitable structurants are those materials which when added to a composition, will increase the zero shear rate viscosity. They include swelling clays, for example laponite; fatty acid and derivatives thereof, in particular fatty acid monoglyceride polyglycol ether; cross-linked polyacrylates such as Carbopol (TM) (polymers available from Goodrich); acrylates and copolymers thereof;

polyvinylpyrrolidone and copolymers thereof; polyethylene imines; salts such as sodium chloride and ammonium sulphate; sucrose esters; gellants; and mixtures thereof.

Of the clays particularly preferred are synthetic hectorite (laponite) clay used in conjunction with an electrolyte salt capable of causing the clay to thicken so as to suspend the benefit agent. Suitable electrolytes include alkali and alkaline earth salts such as halides, ammonium salts and sulphates.

Particularly preferred structurants include fatty acids and derivatives thereof and cross-linked polyacrylates.

Whilst some materials can function as both a benefit agent and structurant it will be appreciated that the benefit and structuring function cannot be provided by the same component. However, it will be understood that where the composition comprises two or more benefit agents one of said benefit agents may also function as a structurant.

The compositions according to the invention may also comprise a thickening agent, i.e. a material which maintains the viscosity of the composition as the shear rate thereof is increased during use. Suitable materials include cross-linked polyacrylates such as Carbopol (TM) (polymers available from Goodrich); fatty acid and derivatives thereof, in particular, fatty acid monoglyceride polyglycol ether; natural gums including alginates, guar, xanthan and polysaccharide derivatives including carboxy methyl cellulose and hydroxypropyl guar; propylene glycols and propylene glycol oleates; salts such as sodium chloride and ammonium sulphate; glycerol tallowates; and mixtures thereof.

Further examples of structurants and thickeners are given in the International Cosmetic Ingredient Dictionary, Fifth Edition, 1993, published by CTFA (The Cosmetic, Toiletry & Fragrance Association), incorporated herein by reference.

The surface active agent can be selected from any known surfactant suitable for topical application to the human body. Mild surfactants, i.e. surfactants which do not damage the stratum corneum, the outer layer of the skin, are particularly preferred.

One preferred anionic detergent is fatty acyl isethionate of formula:

$$RCO_2CH_2CH_2SO_3M$$

where R is an alkyl or alkenyl group of 7 to 21 carbon atoms and M is a solubilising cation such as sodium, potassium, ammonium or substituted ammonium. Preferably at least three quarters of the RCO groups have 12 to 18 carbon atoms and may be derived from coconut, palm or coconut/palm blends.

Another preferred anionic detergent is alkyl ether sulphate of formula:

$$RO(CH_2CH_2O)_nSO_3M$$

where R is an alkyl group of 8 to 22 carbon atoms, n ranges from 0.5 to 10, especially from 1.5 to 8, and M is a solubilising cation as defined above.

Other possible anionic detergents include alkyl glyceryl ether sulphate, sulphosuccinates, taurates, sarcosinates, sulphoacetates, alkyl phosphate, alkyl phosphate esters and acyl lactates, alkyl glutamates and mixtures thereof.

Sulphosuccinates may be monoalkyl sulphosuccinates having the formula: $R^5O_2CCH_2CH(SO_3M)CO_2M$; and amido-MEA sulphosuccinates of the formula: $R^5CONHCH_2CH_2O_2CCH_2CH(SO_3M)CO_2M$; wherein R^5 ranges from C_8-C_{20} alkyl, preferably C_{12}-C_{15} alkyl, and M is a solubilising cation.

Sarcosinates are generally indicated by the formula: $R^5CON(CH_3)CH_2CO_2M$, wherein R^5 ranges from C_8-C_{20} alkyl, preferably C_{12}-C_{15} alkyl and M is a solubilising cation.

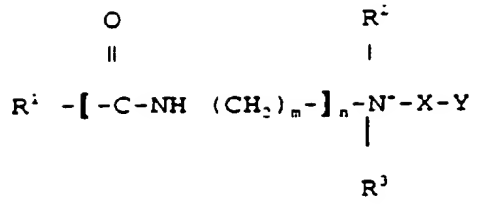
Taurates are generally identified by the formula: $R^5CONR^6CH_2CH_2SO_3M$, wherein R^5 ranges from C_8-C_{20} alkyl, preferably C_{12}-C_{15} alkyl, R^6 ranges from C_1-C_4 alkyl, and M is a solubilising cation.

Harsh surfactants such as primary alkane sulphonate or alkyl benzene sulphonate will generally be avoided.

Suitable nonionic surface active agents include alkyl polysaccharides, lactobionamides, ethyleneglycol esters, glycerol monoethers, polyhydroxyamides (glucamide), primary and secondary alcohol ethoxylates, especially the C_{8-20} aliphatic alcohols ethoxylated with an average of from 1 to 20 moles of ethylene oxide per mole of alcohol.

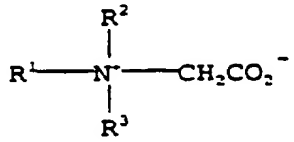
The surface active agent is preferably present at a level of from 1 to 35 wt%, preferably 3 to 30 wt%.

It is also preferable that the composition includes from 0.5 to 15 wt% of a cosurfactant with skin-mildness benefits. Suitable materials are zwitterionic detergents which have an alkyl or alkenyl group of 7 to 18 carbon atoms and comply with an overall structural formula

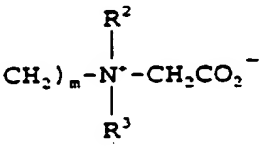


where R^1 is alkyl or alkenyl of 7 to 18 carbon atoms;
R^2 and R^3 are each independently alkyl, hydroxyalkyl or carboxyalkyl of 1 to 3 carbon atoms;
m is 2 to 4;
n is 0 or 1;
X is alkylene of 1 to 3 carbon atoms optionally substituted with hydroxyl; and
Y is $-CO_2^-$ or $-SO_3^-$

Zwitterionic detergents within the above general formula include simple betaines of formula:-



and amido betaines of formula:-

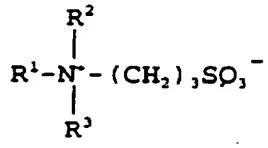


where m is 2 or 3.

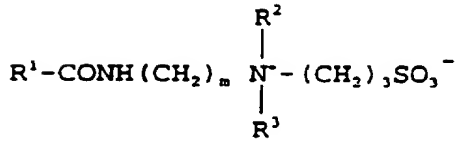
In both formulae R^1, R^2 and R^3 are as defined previously. R^1 may, in particular, be a mixture of C_{12} and C_{14} alkyl groups derived from coconut so that at least half, preferably at

least three quarters, of the group R^1 has 10 to 14 carbon atoms. R^2 and R^3 are preferably methyl.

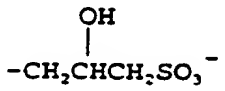
A further possibility is a sulphobetaine of formula:-



or



where m is 2 or 3, or variants of these in which $-(CH_2)_3SO_3^-$ is replaced by



R^1, R^2 and R^3 in these formulae are as defined previously.

Furthermore, the benefit agent may also function as a carrier to deliver efficacy agents to skin treated with the compositions of the invention. This route is particularly useful for delivering efficacy agents which are difficult to deposit onto the skin or those which suffer detrimental interactions with other components in the composition. In such cases the carrier is a often a silicone or hydrocarbon oil which is not solubilised/micellised by the surface active phase and in which the efficacy agent is relatively soluble. Examples of such efficacy agents include anti-viral agents; hydroxycaprylic acids; pyrrolidone; carboxylic acids; 2,4,4'-trichloro-2'-hydroxydiphenyl ether (Irgasan DP300); 3,4,4'-trichlorocarbanilide; salicylic acid; benzoyl

peroxide; perfumes; essential oils; germicides and insect repellants such as N,N-dimethyl m-toluamide (DEET); and mixtures thereof.

Compositions of the invention may be formulated as products for washing the skin, for example bath or shower gels, hand washing compositions, facial washing liquids; pre-and post-shaving products; rinse-off, wipe-off and leave-on skin care products.

The compositions of the invention will generally be pourable liquids or semi-liquids for example pastes and will preferably have a viscosity in the range 1000 to 100,000 mPas measured at a shear rate of $10s^{-1}$ at 25°C in a Haake Rotoviscometer RV20.

The compositions will exhibit a Newtonian viscosity at a shear stress of 0.01 Pa at 25°C of at least 5,000 Pas preferably greater than 10,000 Pas.

The above-mentioned characteristic viscosity measurements may be determined exactly (as in the case of the non-zero shear viscosites) using, for example, a Carrimed CSL 100 low stress rheometer, or obtained from an extrapolation according to the Cross Model (see J of the Chemical Engineer, 1993, paper entitled "Rheology for the Chemical Engineer" by H Barnes) as in the case of the zero shear rate.

Other typical components of the compositions include opacifiers, preferably 0.2 to 2.0 wt%; preservatives, preferably 0.2 to 2.0 wt% and perfumes, preferably 0.5 to 2.0 wt%.

According to a further aspect of the invention there is provided a process for preparing compositions according to the invention comprising:-

a) structuring the base formulation comprising at least on surface active agent selected from anionic, nonionic, zwitterionic, and cationic surface active agents, and mixtures thereof with a structurant; and

b) mixing the structured base formulation with the benefit agent.

The invention will be further illustrated by reference to the following non-limiting examples.

Examples

In the examples:-

Alkylpolyglucoside was Plantaren 2000 ex Henkel

Coco amidopropyl betaine was Amonyl BA 380 ex Seppic.

Cross-linked polyacrylate was Carbopol ETD 2020 ex Goodrich.

Fatty acid monoglyceride polyglycol ether was Rewoderm L1580 ex Rewo.

Guar hydroxypropyl trimonium chloride was Jaguar C-13-S ex Meyhall.

Silicone oil emulsion was BC 92/057 ex Basildon.

Silicone oil was DC200, a polydimethylsiloxane ex Dow Corning with a viscosity of 60000 mPas.

Sodium lauryl ether sulphate was Genapol ZRO ex Hoechst

Thickener was Antil 141 (a propylene glycol and propylene glycol oleate) ex Goldschmidt

Examples I-II

The following method was used to determine the amount of benefit agent deposited onto full thickness porcine skin (5 x 15 cm) treated with compositions according to the invention.

The skin was prehydrated and then 0.5 ml of the product applied to it. The product was lathered for 10 seconds and then rinsed for 10 seconds under running water.

Thereafter the skin was wiped once with a paper towel to remove excess water.

2 minutes after drying a strip of adhesive tape was pressed onto the skin for 30 seconds by applying a constant load of 100g.cm^{-2}. The adhesive tape employed was J-Lar Superclear (TM) tape having a width of 2.5cm. In total ten strips of tape were applied to adjacent sites on the skin.

In this test procedure silicone which has deposited on the skin will subsequently be transferred to the tape along with some of the outer layer of the skin.

The amounts of silicon and skin adhering to the tape are determined by means of X-ray fluorescence spectroscopy. The tape strips are placed in an X-ray fluorescence spectrometer with the adhesive side facing the beam of this machine. A mask is applied over the tape to define a standardised area in the middle of the tape which is exposed to the X-ray beam. The sample chamber of the machine is placed under vacuum before making measurements and the spectrometer is then used to measure the quantities of silicon and sulphur. The sulphur is representative of the amount of skin which has transferred to the tape.

The amounts of silicon and sulphur observed with a clean piece of adhesive tape are subtracted from the experimental measurements. The experimental measurements for the average levels of sulphur and silicon are expressed as a ratio of silicon to sulphur. From this ratio it is possible to determine silicone oil deposition per unit area of skin.

Example I

In this example deposition of silicon from a composition comprising a silicone oil with a weight average size of 80 microns was determined and compared with that from a similar composition (composition A) comprising a silicone oil emulsion having a weight average size of 0.5 micron.

A base shower gel formulation having the following composition was prepared.

	% by weight
Sodium lauryl ether sulphate	13.0
Coco amidopropyl betaine	2.0
Sorbic acid	0.37
Sodium citrate dihydrate	0.49
Fatty acid monoglyceride polyglycol ether	3.00
Citric acid	-0.01*
Water + minors	to 100

* This level can be varied to obtain a pH for the composition of 5.3.

The viscosity of the composition was 5500 mPas at $10s^{-1}$ and 25°C.

The base formulation was prepared by mixing sodium lauryl ether sulphate and betaine. Thereafter the remaining components were added with mixing.

Two Harvard 44 syringe pumps were used to infuse the base formulation and the benefit agent, silicone oil. Silicone oil was present at a level of 5 wt% based on the total composition. One syringe was filled with the base formulation and the other with silicone oil. The syringes were

then inserted into the syringe pump and the infusion rate set at 5:95 oil:base. The oil and base were forced through a static in-line mixer and a composition with oil particles of the required size obtained. The size of the particles can be controlled by the diameter of the static mixer, the flow rate and length of the mixer tube. The size of the particles can be determined using a Malvern Mastersizer.

Comparative Composition (Composition A)

	%wt
Sodium lauryl ether sulphate	13.00
Coco amidopropyl betaine (CAPB)	2.00
Silicone oil emulsion	5.00
Guar hydroxypropyl trimonium chloride	0.10
Sorbic acid	0.37
Sodium citrate dihydrate	0.49
Sodium chloride*	2
Citric acid*	0.01
Water + minors	to 100

\# level can be varied in order to give the required viscosity of 5000 mPas at $10s^{-1}$ and 25°C.

* level can be varied in order to give the required pH.

Silicone deposition of these compositions were measured by the test procedure described above and the following results obtained.

	Si:S
Example I	25.6
Comparison (A)	2.2

The results demonstrate the improved deposition achieved when the composition comprises large particle size silicone oil.

Example II

A base shower gel formulation having the following composition was prepared.

	%wt
Sodium lauryl ether sulphate	4.00
Sodium coco amido propyl betaine	1.00
Alkylpolyglucoside	5.00
Sorbic acid	0.37
Trisodium citrate dihydrate	0.49
Cross-linked polyacrylate	0.9
Thickener**	~1
5N NaOH***	~1
Water + minors	to 100

** Thickener was added to give the required viscosity (~5000 mPas at $10s^{-1}$ and 25°C)

*** 5N NaOH was added to adjust the pH of the composition to pH 5.3.

The benefit agent used was silicone oil with a viscosity of 60000 mPas.

The composition was prepared by dispersing the polyacrylate in excess water. Thereafter sorbic acid and trisodium citrate dihydrate were added to the resulting polymer dispersion. The three surface active agents were mixed and the resulting mix added to the polymer dispersion. Thereafter minors were added. The viscosity of the resulting composition was measured at a shear rate of $10s^{-1}$ at 25°C and thickener added until the required viscosity obtained.

The base formulation and silicone oil were infused using two Harvard 44 syringe pumps as described above. The viscosity of the final product was 5500 mPas.

Compositions comprising a number of different sized oil particles were prepared. Silicone deposition from these compositions was measured by the test procedure described above and compared with that from composition (A).

The following results were obtained:-

Particle size of silicone oil	Si:S ratio
0.5	0.8
24	1.4
52	3.7
88	8.3
130	16.8
138	18.1

The results demonstrate the benefit of using large particle size benefit agent.

The products were stored in a sealed glass vessel at 37°C. After 6 weeks they were still stable, i.e. there was no visible separation.

Example III

In this example the stability of a composition according to the invention structured with a cross-linked polyacrylate was compared with an identical composition from which the structurant was absent.

The composition comprised

	%wt
Sodium lauryl ether sulphate	4.00
Sodium coco amido propyl betaine	1.00
Alkylpolyglucoside	5.00
Sorbic acid	0.37
Trisodium citrate dihydrate	0.49
Cross-linked polyacrylate	0.9#
Thickener	0.97
Water + minors	to 100

5N NaOH was added to adjust the pH of the composition to pH 5.3.

absent from the comparative formulation.

The benefit agent used was silicone oil present in an amount of 5wt%.

The viscosity of the product according to the invention and of the comparison were, respectively, 4628 and 5500 mPas at $10s^{-1}$ and 25°C and 22783 and 12.16 mPas at 0.01 Pa and 25°C.

Both compositions were stored in sealed glass vessels and placed in a oven at 37°C.

Whereas the comparative composition separated after three days the composition according to the invention was still stable after 4 weeks.

CLAIMS

1. An aqueous liquid cleansing and moisturising composition comprising:-

a) a surface active agent selected from anionic, nonionic, zwitterionic, and cationic surface active agents, and mixtures thereof;

b) a benefit agent having a weight average particle size in the range 50 to 500 microns; and

c) at least one structurant;

wherein the composition is substantially free of insoluble fatty acid soap and has a viscosity of at least 5,000 Pas at a shear stress of 0.01 Pa at 25°C.

2. A composition according to claim 1 wherein the structurant is selcted from swelling clays; fatty acid and derivatives thereof; cross-linked polyacrylates; acrylates and copolymers thereof; polyvinylpyrrolidone and copolymers thereof; polyethylene imines; salts; sucrose esters; gellants; and mixtures thereof.

3. A composition according to claim 1 wherein the benefit agent is selected from silicone oils; gums; fats; oils; waxes; hydrophobic plant extracts; hydrocarbons; higher fatty acids; higher fatty alcohols; esters; essential oils; lipids; phospholipids; vitamins; sunscreens; and mixtures thereof.

4. A composition according to any one of the preceding claims comprising 0.1 to 15 wt% of the benefit agent.

5. A composition according to any one of the preceding claims wherein the benefit agent functions as a carrier to deliver efficacy agents to skin treated with the composition.

6. A composition according to any one of the preceding claims comprising 1 to 35 wt% of the surface active agent.

7. A process for preparing a composition according to claim 1 comprises:-

a) structuring the base formulation comprising at least one surface active agent selected from anionic, nonionic, zwitterionic and cationic surface active agents and mixtures thereof; and

b) mixing the structured base formulation with the benefit agent.

8. A method of depositing a benefit agent from an aqueous liquid cleansing and moisturising composition, the method comprising providing the benefit agent in a composition comprising

a) a surface active agent selected from anionic, nonionic, zwitterionic, and cationic surface active agents, and mixtures thereof;

b) the benefit agent having a weight average particle size in the range 50 to 500 microns; and

c) at least one structurant;

the composition being substantially free of insoluble fatty acid soap and having a viscosity of at least 5,000 Pas at a shear stress of 0.01 Pa at 25°C.

INTERNATIONAL SEARCH REPORT

national Application No
PCT/GB 95/01687

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61K7/00 A61K7/50

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO,A,94 01084 (THE PROCTER & GAMBLE COMPANY) 20 January 1994 cited in the application see the whole document ---	1-8
X	EP,A,0 452 202 (L'OREAL) 16 October 1991 see the whole document ---	1-8
X	WO,A,93 19149 (THE PROCTER & GAMBLE COMPANY) 30 September 1993 see the whole document ---	1-8
P,X	WO,A,94 17166 (THE PROCTER & GAMBLE COMPANY) 4 August 1994 see the whole document ---	1-8
	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 December 1995	10.01.96

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Couckuyt, P

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